

**AMENDMENTS TO THE DRAWINGS**

The attached sheets of drawings includes changes to Figures 1-23. These sheets replace the original sheets including Figures 1-23.

Attachment:      Replacement Sheets

**REMARKS*****Status of the claims***

Claims 1-146 were pending in the application. Claims 48-146 were previously withdrawn from consideration. By virtue of this response, claims 11-12, 14-15, 22, and 24 have been cancelled, claims 1-3, 5-10, 13, 17-19, 25-28, 30-34, 36, and 39-47 have been amended, and new claim 147 has been added. Claims 1-10, 13, 16-21, 23, 25-47, and 147 are currently under consideration.

The amendments and new claims are supported by the specification. The amendments to claim 1 are supported, for example, in paragraphs [0009], [0010], [0049], [0058], and [0081]. The amendment to claim 5 is supported, for example, in paragraph [0010]. The amendment to claims 9 and 10 are supported, for example, in paragraph [0068]. The amendments to claims 17, 18, and 19 are supported, for example, in paragraph [0054]. New claim 147 is supported, for example, in paragraph [0054]. Amendments to other claims were made to provide consistency of claim language throughout the claim set. No new matter has been added by the foregoing amendments.

With respect to all amendments and canceled claims, Applicant has not dedicated to the public or abandoned any unclaimed subject matter and moreover has not acquiesced to any rejections and/or objections made by the Patent Office. Applicant reserves the right to pursue prosecution of any presently excluded claim embodiments in one or more future continuation and/or divisional applications.

***Information Disclosure Statement***

The Office Action states that the Information Disclosure Statement (IDS) filed on May 15, 2002, did not include a copy of reference no. 41, and therefore this reference has not been considered. Submitted herewith is another copy of reference no. 41, along with a clean copy of the Form 1449 that was filed with the IDS on May 15, 2002. Applicant would appreciate the Examiner initialing next to reference no. 41, indicating that the reference has been considered and made of record in this application.

***Drawings***

The Examiner has requested Applicant to submit corrected drawings. Replacement drawings are submitted herewith. Figures 1-3 have been amended to include a legend reciting “Prior Art,” as requested. The new formal drawings also recite “Replacement Sheet” in the page header, as requested.

***Claim objections***

Claim 6 has been objected to due to a typographical error in the word “least,” which is spelled “lest” in the claim. The claim has been amended to correct this error, rendering the objection moot.

Claim 41 has been objected to due to a typographical error in the word “coupled,” which is spelled “couple” in the claim. The claim has been amended to correct this error, rendering the objection moot.

***Rejections under 35 U.S.C. §112, second paragraph***

Claim 1 has been rejected as allegedly indefinite due to recitation of the phrase “oriented about the center.” This phrase has been deleted from claim 1 as amended, rendering this rejection moot.

Claims 5, 6, 13, and 39 have been rejected as allegedly indefinite due to recitation of “the at least one strut,” which the Examiner alleges lacks antecedent basis, since “a plurality of struts” is set forth in claim 1. The phrase “the at least one strut” has been deleted from claim 5 as amended, and the word “the” has been deleted from this phrase in claims 6, 13, and 39 as amended, rendering this rejection moot.

Claim 11 has been rejected as allegedly indefinite due to recitation of the phrase “each strut is adapted to react a load in an axial direction.” This claim has been canceled, rendering this rejection moot.

Claim 18 has been rejected as allegedly indefinite due to recitation of the phrase “the hub is adapted to receive a spindle for transferring a load.” This phrase has been deleted from claim 18 as amended, rendering this rejection moot.

Claim 19 has been rejected as allegedly indefinite due to recitation of the phrase “the hub is adapted to transfer a load to a second support structure located upstream.” This phrase has been deleted from claim 19 as amended, rendering this rejection moot.

Claims 42, 43, 45, and 47 have been rejected due to recitation of “the outer containment,” which the Examiner alleges lacks antecedent basis, since it is recited in the intended use recited in the preamble of claim 1. Claims 42, 45, and 47 have been amended to recite “an outer containment,” rendering this rejection moot.

Claim 46 has been rejected due to recitation of “the at least a portion of distal ends,” which the Examiner alleges lacks antecedent basis. The word “the” has been deleted from claim 46 as amended, rendering this rejection moot.

In view of the foregoing, Applicant respectfully requests reconsideration and withdrawal of the rejections under 35 U.S.C. §1112, second paragraph.

***Rejections under 35 U.S.C. §102(b)***

Claims 1-5, 7, 9-11, 14-19, 25-34, 37, 38 and 42-45 have been rejected under 35 U.S.C. §102(b) as allegedly anticipated by Downs et al. (GB 2 092 817). Applicant respectfully traverses this rejection.

Claim 1 as amended recites “a support structure *for supporting a catalyst structure in a catalytic reactor.*” Downs et al. do not teach a structure for supporting a catalyst structure. Rather, this reference is directed to a support grid for triangular arrays of nuclear fuel rods. Downs et al. teach a hexagonally-shaped structure formed from a plurality of concentric rings and a plurality of webs extending radially between adjacent rings to define a triangular array of cells for receiving nuclear fuel rods. Downs et al. do not teach or suggest support of a catalyst structure in a catalytic reactor as claimed.

Further, the structures taught by Downs et al. do not include branched *segments* as presently claimed. The structures of Downs et al. comprise a series of *continuous* concentric rings with web sections in between the rings to define areas for receiving nuclear fuel rods. The rings are welded at the corners of the hexagon (page 1, lines 118-120). Thus, the structure does not contain separable branched segments.

Further, claim 1 as amended recites that each branched segment comprises a primary strut with a proximal end proximal to the center and a distal end extending toward the perimeter, a secondary strut contacting the primary strut at the proximal end of the secondary strut, and additional secondary struts each contacting the previous strut toward the center at the proximal end of each additional secondary strut. The structures taught by Downs et al. do not contain secondary struts that contact a primary strut or a previous strut at the proximal end of each secondary strut. For example, in the structure depicted in Figures 1 and 2, webbing elements “22” contact sections of concentric rings “4” at a point intermediate between the welded corners of each section. The structures depicted in these figures do not read on the presently claimed support structure because they do not contain a branched series of alternating struts each contacting a previous strut toward

the center at its proximal end. In addition, the text of the disclosure does not teach such a branched arrangement with secondary struts each contacting the previous strut at its proximal end.

In addition, claim 1 as amended recites that the claimed support structure does not cause significant deformation of the catalyst structure at high axial loads, and that the struts are configured such that they are free to thermally expand and contract as the temperature changes and to provide substantially uniform support with respect to a substantial portion of the catalyst structure. Downs et al. do not teach any of these functional limitations with respect to the disclosed support structures. There is no discussion of thermal expansion and contraction in response to a temperature change. There is also no discussion of providing uniform and non-deformable support for a catalyst structure, because the device of Downs et al. is directed to providing support for an array of nuclear fuel rods rather than a catalyst structure.

Claim 1 as amended further recites that the support structure comprises a plurality of struts configured to minimally obstruct flow of a gas reaction mixture. Downs et al. do not discuss minimal obstruction of flow of a gas mixture with respect to the described devices. The devices taught by Downs et al. would not be expected to include this feature since the sections into which the device is divided by webbing between concentric rings is designed to contain nuclear fuel rods rather than a flowing gas reaction mixture.

In view of the foregoing, Applicant respectfully requests reconsideration and withdrawal of the rejection under 35 U.S.C. §102(b).

Claims 1-16, 20-24, 29 and 42 have been rejected under 35 U.S.C. §102(b) as allegedly anticipated by Humpolik (U.S. Patent No. 5,342,588). Applicant respectfully traverses this rejection.

Humpolik teaches a support matrix for a catalytic reactor, with stacks of sheet metal strips arranged in a twisting pattern. This reference does not anticipate the present claims because it does not teach a support structure with branched segments comprising a primary strut and branched, alternating secondary struts as claimed.

With reference to the figures of Humpolik, Figures 1, 2, 6, and 7 all depict embodiments in which stacks of metal strips each contact or are proximal to the center of the support structure. In these structures depicted in Figures 1, 2, and 7, the stacks of metal strips appear to have a common intersection point at the center and in the embodiment depicted in Figure 6, the stacks are twisted to define a central rectangular cavity (see Fig. 6c). None of these structures contains branching “secondary” structural elements each contacting the previous element at its proximal end as claimed. Figures 3 and 4 depict embodiments in which the support structure contains four stacks of metal strips that are displaced relative to one another above and below a displacement plane E-E perpendicular to the plane of the drawing, producing a displaced cross. The free ends of each of the four stacks is twisted around a central point of symmetry. Neither of the structures depicted in these figures contains branching “secondary” structural elements each contacting the previous element at its proximal end as claimed.

In addition, claim 1 as amended recites that the claimed support structure does not cause significant deformation of the catalyst structure at high axial loads, and that the struts are configured such that they are free to thermally expand and contract as the temperature changes and to provide substantially uniform support with respect to a substantial portion of the catalyst structure. Humpolik does not teach any of these functional limitations with respect to the disclosed support structures. There is no discussion of thermal expansion and contraction in response to a temperature change, and no discussion of providing uniform and non-deformable support for a catalyst structure.

In view of the foregoing, Applicant respectfully requests reconsideration and withdrawal of the rejection under 35 U.S.C. §102(b).

***Rejection under 35 U.S.C. §103***

Claims 35, 36, 39-40, 46 and 47 have been rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Downs et al. (GB 2 092 817) in view of Piepers et al. (U.S. Patent No. 3,889,438). Applicant respectfully traverses this rejection.

As an initial matter, Piepers et al. is directed to a structure for supporting nuclear fuel rods, which is in a different field of endeavor than a catalyst support structure as claimed. The respective support structures have functionally different uses. Since the reference is in a non-analogous field, it cannot be relied on for a rejection under 35 U.S.C. §103(c). MPEP §2141.01(a).

Further, a *prima facie* case for obviousness requires, *inter alia*, that references when combined must teach or suggest all of the elements of rejected claims. MPEP §2143.03. As discussed above, the Downs et al. reference does not anticipate the present claims because it does not teach a structure with branched segments comprising alternating struts each contacting a previous strut toward the center at its proximal end. In addition, Downs et al. does not teach a support structure that does not cause significant deformation of the catalyst structure at high axial loads, or with struts that are configured such that they are free to thermally expand and contract as the temperature changes and to provide substantially uniform support with respect to a substantial portion of the catalyst structure as claimed. The Piepers et al. reference does not supply these missing claim elements. Piepers et al. teach a lattice of compartments formed by intersecting bands. This reference does not teach or suggest a support structure comprising branched segments as claimed, and there is no discussion of expansion or contraction in response to temperature changes or uniform and non-deformable support for a catalyst structure. Further, as discussed above, claim 1 as amended recites that the support structure comprises a plurality of struts configured to minimally obstruct flow of a gas reaction mixture. Neither Downs et al. nor Piepers et al. discuss minimal obstruction of flow of a gas mixture with respect to the described devices. Neither of these references describe structures that would not be expected to include this feature since both of these references teach structures with sections designed to contain nuclear fuel rods rather than a flowing gas reaction mixture.

In view of the foregoing, Applicant respectfully requests reconsideration and withdrawal of the rejection under 35 U.S.C. §103(a).

***Allowable subject matter***

Applicant acknowledges with appreciation the indication in the Office Action that claim 41 contains allowable subject matter, and is objected to solely for being dependent on a rejected base claim.

**CONCLUSION**

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to withdraw the outstanding rejection of the claims and to pass this application to issue. If it is determined that a telephone conference would expedite the prosecution of this application, the Examiner is invited to telephone the undersigned at the number given below.

In the event the U.S. Patent and Trademark office determines that an extension and/or other relief is required, Applicant petitions for any required relief including extensions of time and authorizes the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to Deposit Account No. 03-1952 referencing docket no. 220772008900. However, the Commissioner is not authorized to charge the cost of the issue fee to the Deposit Account.

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Respectfully submitted,

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